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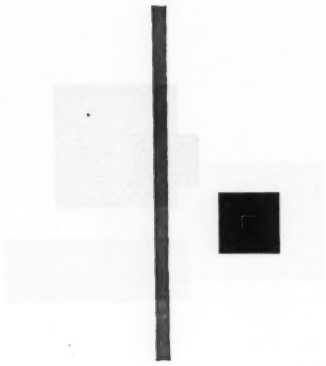

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Dental Digest

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August 1961

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About Our CONTRIBUTORS

LAWRENCE WILAND, D.D.S. (New York University, 1956) is a general practitioner and is engaged in teaching clinical prosthesis. His first contribution to DIGEST appears in the current issue: A PRACTICAL PROCEDURE FOR RECORDING CHANGES IN VERTICAL DIMENSION OF ARTICULATED MODELS.

DUANE ARTHUR SCHMIDT, D.D.S. (State University of Iowa, College of Dentistry, 1954) Honor Graduate, Pedodontia (State University of Iowa, College of Dentistry, 1957) completes in this issue his four-part serial article, STAINLESS STEEL CROWNS AND THE CHILD PATIENT.

JOHN B. PUCKETT, D.D.S. (Baylor University, College of Dentistry, 1931) publishes his third article in DIGEST this month, THE EFFECTIVE FRENECTOMY.

VICTOR C. AUTH, A.B. (New York University, 1956), D.D.S. (Columbia University, 1960) is in general practice and has published several articles. For his first appearance in DIGEST he presents A TECHNIQUE FOR CEMENTATION OF FULL COVERAGE RESTORATIONS.

HARRY L. PAGE, educated at Hotchkiss and Yale, has made many significant contributions to dental literature. Mr. Page has been a contributor to DIGEST since 1951 and will be remembered for his special approach to the subject of articulation. This month he presents another article, THE HINGE-BOW AND THE FACE-BOW: AN EVALUATION.

HAROLD S. JONES, D.D.S. (University of Pennsylvania Dental School, 1918) is a general practitioner who first contributed to DIGEST in 1957. This month Doctor Jones presents REBASING PARTIAL DENTURES.

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A Practical Procedure for Recording Changes

IN VERTICAL DIMENSION OF ARTICULATED MODELS

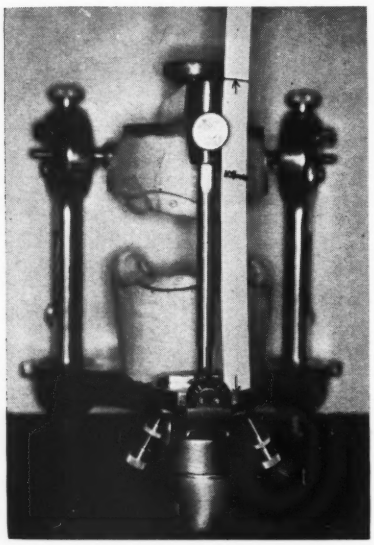
LAWRENCE WILAND, D.D.S.,* Flushing, New York

DIGEST

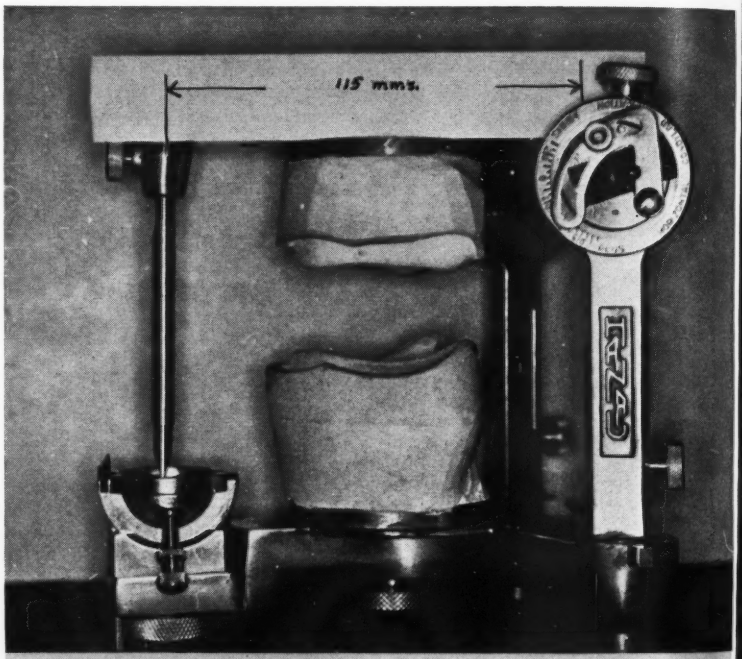
When changes in the vertical dimension of articulated casts are essential, the amount of change at the incisal pin is not the same as the dimension between the casts at different points. Only approximate changes, therefore, can be made at these points. This article describes a procedure for making accurate changes in the vertical dimension at any designated point on the models.

Equipment and Materials

A Hanau articulator is used in describing the technique because the author is familiar with this particular instrument. The procedure can, however, be completed using any articulator. The materials needed are a rigid millimeter ruler and a Boley gauge.



2.
The distance along the incisal pin from the incisal guide table to the top of the moving arm is measured at its present position. This is not a fixed measurement and must be taken in each case.



1.
The upper member of the articulator (moving arm) is measured in its horizontal length as shown in Step 1.

Method of Presentation

The method employed will be described in a practical way by using as an example the following specific set of conditions: for example, a decrease of 3 millimeters of vertical dimension is desired at a point on the cast approximating the maxillary incisal edges of the teeth.

Procedure

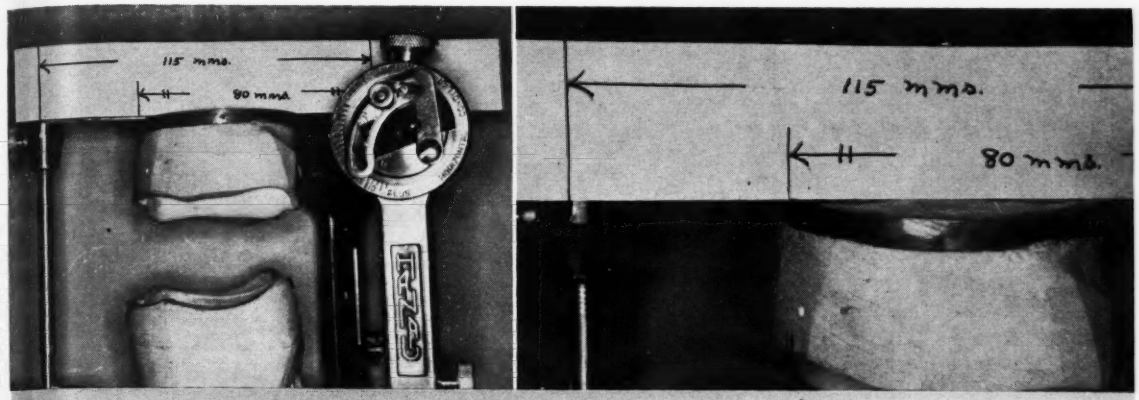
The following steps may be completed:

Step 1—The upper member of the articulator (moving arm) is measured in its horizontal length. In the case of the Hanau articulator, this measurement is 115 millimeters. This is a fixed dimension and can be used for all procedures (Fig 1).

Step 2—The distance along the incisal pin from the incisal guide table to the top of the moving arm is measured at its present position. The measurement in this case is 108 millimeters. This is not a fixed measurement and must be taken in each case (Fig 2).

Step 3—The point is selected on the

*Instructor, Clinical Prosthesis, New York University; Clinical Assistant, Flushing Hospital.



3 and 4.
The point is selected on the upper model and carried up to the articulator arm where the change in dimension is desired. At this point the horizontal length is measured from the condyle element to the marked point.

upper model and carried up to the articulator arm where the change in dimension is desired. At this point the horizontal length is measured from the condyle element to the marked point. The measurement in this case is 80 millimeters (Figs. 3 and 4).

Step 4—The only missing component at this point is how much the incisal pin must be altered to accomplish the 3-millimeter change at the incisal point on the cast.

Step 5—By setting up a proportion the problem can be solved in the following manner:

$$\frac{\text{Partial Horizontal Length}}{\text{Amount of Change Desired}} :: \frac{\text{Total Horizontal Length}}{\text{Amount of Change at Incisal Pin}}$$

or

80 mm. : 115 mm. :: 3 mm. : X

X = 4.3 mm.

Step 6—If the incisal pin is closed 4.3 millimeters, using the Boley gauge (Fig. 5), there will be a 3-millimeter closure at the incisal edges of the teeth (Figs. 6 and 7).

108 millimeters
− 4.3 millimeters
103.7 millimeters
(New measurement at incisal pin. See Step 2).

Summary

A practical procedure has been described and illustrated for accurate measurement in recording changes in the vertical dimension of articulated models by means of a simple mathematical procedure.

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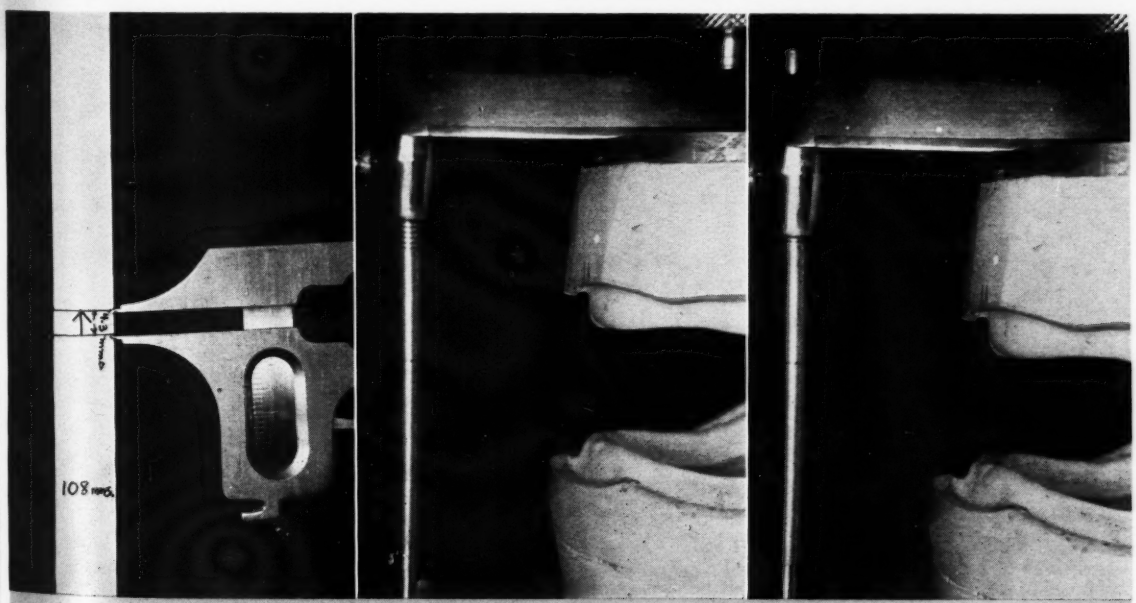


5, 6, and 7.
If the incisal pin is closed 4.3 millimeters, using the Boley gauge there will be a 3-millimeter closure at the incisal edge of the teeth.

STAINLESS STEEL CROWNS

and the Child Patient—Part Four

DUANE A. SCHMIDT, D.D.S., Fort Dodge, Iowa

DIGEST

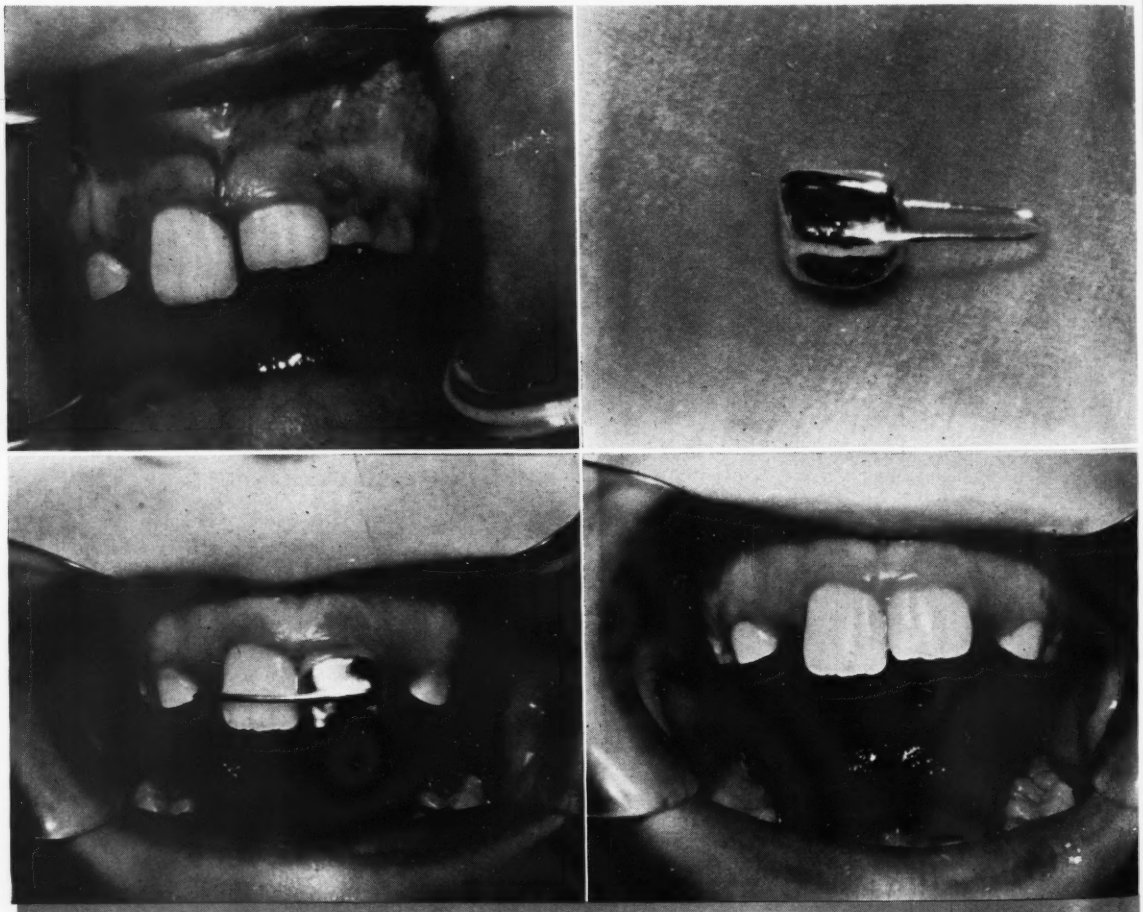
In this installment which is the last of a series of four articles presented under the same general title, the author describes the various functions of the stainless steel crown in children's dentistry by means of brief case histories demonstrating the precise applications of the technique.

Case One, Bracing with Crowns (Figures 1-4)

A 9-year-old boy was injured by a baseball bat. After medical treatment for a week he was referred for dental treatment. Examination showed that the right central incisor protruded 4 or 5 millimeters, was extremely mobile, and that the gingival tissue was inflamed. The radiograph showed a vague radioluscent area at the apex of the injured tooth.

Diagnosis—It was conjectured that if the tooth could be immobilized for several months it might reattach and become stabilized.

Proposed Treatment—It was feared that if the tooth that had been dislodged from its socket were stabilized to the other central incisor that tooth



1.
Case One. The right central incisor was extremely mobile when first examined. As shown in this figure it was traumatically extruded from 3 to 4 millimeters.

2.
Stainless steel crown with wire loop (.032 round wire).

3.
The bracing appliance is shown cemented in place on the firm left central incisor.

4.
Eleven months postoperatively the tooth had not extruded further as did the abutment tooth.

5.
Case Two. Rampant caries of the anterior teeth.
6.
Anterior deciduous maxillary teeth restored to function with stainless steel crowns.
7.
Case Three. Retention areas were established by spot welding and soldering round wire (.032) to the labial surfaces of the lower deciduous cuspid steel crowns.
8.
Mandibular removable partial denture in place showing wire clasp utilization of the cuspid in artificially created retention areas.

would erupt further and draw the injured tooth with it. The loose central would have less chance for reattachment. A stainless steel crown with a wire loop would (1) stabilize the tooth and aid in resisting excessive pressure; and (2) as the left central incisor continued to erupt the wire loop would slide along the tooth, holding it firm and preventing further protrusion.

Technique

1. The left central incisor was fitted with a stainless steel crown.
2. A wire loop of .032 round wire was fashioned to this crown so that it stabilized the protruded tooth.
3. Spot-welded and soldered joints were made on the labial and lingual of the crown.
4. The joints were smoothed, polished, and the crown was cemented in place.

Results

The mobile central incisor became firm in the arch and in three months the crown and brace were removed. Eleven months afterward recovery continued uneventfully.

Case Two, Crowns on Anterior Deciduous Teeth (Figures 5 and 6)

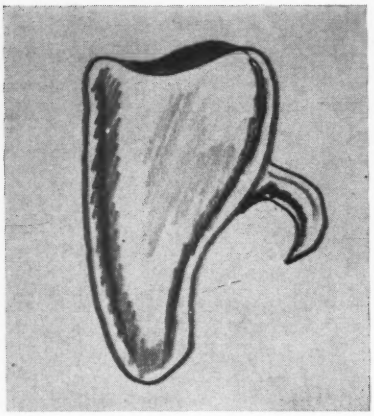
A 3½-year-old girl suffered from rampant caries in the anterior segment of the upper arch only.

Diagnosis—Normally it would be several years before the permanent teeth would replace the carious primary incisors. If immediate treatment was not undertaken the carious area might well intensify to the degree that extraction of the involved teeth would be necessary.

Proposed Treatment—Because it is almost impossible to restore such small teeth successfully it was proposed to use stainless steel crowns on these teeth.

Technique

1. The carious areas were debrided.
2. Two small pulp exposures were discovered.
3. These exposures were treated



9.
Case Four. Shows spur attached to stainless steel crowns (.032 round wire).

with sub-bases and six stainless steel anterior primary crowns were placed on the teeth.

Case Three, Crowns as Partial Abutments (Figures 7 and 8)

A 4½-year-old girl presented with infected first and second primary molars in the right mandibular quadrant. Other primary molars were deeply carious.

Immediate Treatment — Stainless steel crowns were placed on the molar that could be saved; the two right mandibular primary molars were extracted. The parents agreed to a partial denture as part of the treatment plan.

Problem—It was necessary to provide adequate retention of a free-end saddle acrylic partial for the right mandibular quadrant. Wrought wire clasps were designed for the left mandibular cuspid steel crowns to restore carious areas as well as to provide rigidity for a partial denture.

Retention Increased—As is usually the case, the primary cuspid had little retention area. To increase this a round wire (.032) was formed horizontally to the occlusal plane and attached to the labial surface of the steel crowns midway between the incisal tip and the cervix of the tooth. Spot-welded and soldered joints joined the crowns and the wire. These were smoothed and polished and an excellent retention area was established.

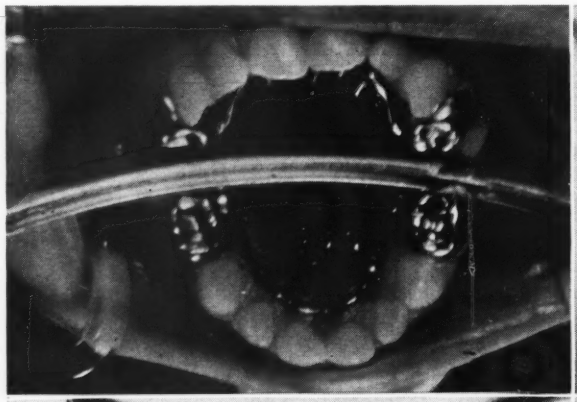
Case Four, Spurs on Crowns to Prevent Thumbsucking (Figure 9)

The patient in this case was a 9-year-old boy who expressed a desire for help in stopping a combination lip-biting, thumb-sucking habit pattern.

Technique

1. Stainless steel crowns were made for the two permanent central incisors.

10



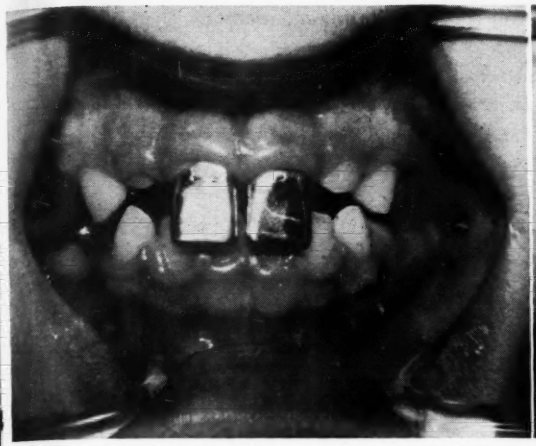
12

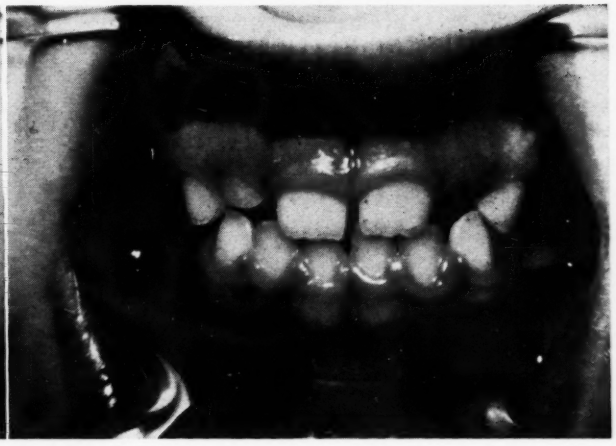
10.
Case Five. Fixed crib thumbsucking preventive appliance attached to two stainless steel crowns.

11.
Case Six. Lingually locked maxillary central incisors.

12.
End-to-end relationship is required to make possible the crown-jumping procedure.

13.
Stainless steel crowns reversed and cemented in place to prevent molar occlusion.





15

14.
Closed bite re-established after five days.

15.
Steel crowns removed. The teeth are shown in proper occluding relation.

2. Round wire (.032) was spot welded and soldered to the lingual of the crowns.

3. The ends of the two wires were bent to point toward the habit area and snipped with wire-cutters so that a sharp spur presented to the thumb when it was introduced into the mouth.

Results Obtained

The habit was controlled immediately; after two months when the appliance was removed the habit was resumed and at the patient's request the crowns were replaced. Four months after the second placement the crowns were removed. The habit had not recurred 12 months later.

Case Five, Crowns with Appliances to Discourage Thumbsucking (Figure 10)

A 3½-year-old girl had developed a 7-millimeter overjet induced by persistent thumbsucking.

Treatment—1. Steel crowns were fitted to the first primary molars in the upper arch.

2. Round wire (.032) was formed into two lingual arch wires between the two crowns. These were spot welded and soldered to the lingual of the crowns.

3. Three round wires (.032) were laid across the two arch wires, spot welded and soldered.

4. The ends of these wires were cut short and bent to present a sharp point.

Results Obtained—The habit was immediately stopped by this fixed crib "reminder" which was removed three months afterwards when it was noted that the upper arch had returned to within 3 millimeters of its proper alinement. Seventeen months later the habit had not been resumed.

Comment—Pursuading the child to accept appliances for habit-reminding is extremely important and requires tact. The child must not be made to feel that he is being punished; he should not feel that he alone has formed a deforming habit; he should be convinced that the dentist is trying to help him. The consequences of ineffective presentation is almost invariably failure. Some habits are probably beyond the limit of dental treatment. These cases should be referred promptly to the proper specialist.

Case Six, Releasing Locked Teeth with Crowns (Figures 11-15)

In an 8½-year-old boy the upper right and left central incisors were in a lingually locked position. An end-to-end bite relationship could be obtained at the retrusive extreme of the mandible.

Proposed Treatment—The method of choice is to place two steel crowns on the teeth so that an inclined plane is presented to the lower teeth, and so that the posterior teeth are held apart.

Object of Treatment—As an attempt is made to occlude the molars, the lower anterior teeth will push against this inclined plane and force the upper teeth outward. The teeth that are now in abnormal position will gradually move out to their normal position and the molars will slowly move together. When the posterior teeth occlude the anterior teeth will be properly alined.

Technique

1. Two stainless steel crowns were adapted to the upper central incisors in a reverse manner.

2. The crimping, cutting, and adapting steps were shortened; emphasis was placed on location of the crowns in relation to the anterior mandibular teeth.

3. The crowns were cemented in the new position and held until the cement hardened.

4. The excess cement was removed. At this point, when the teeth were in the new occlusion, only the two maxillary central incisors were touching the teeth of the lower arch.

5. The patient was given an appointment five days later. The molar relation was normal at this time because of the anterior movement of the maxillary central incisors.

6. The crowns were removed; an attractive and functional result was revealed.

Summary

In the first three articles of this series the value of the stainless steel crown in routine operative dentistry, space maintenance, and in the treatment of fractured anterior teeth was discussed. In this final article of the series the crown is described in function by means of reporting case histories: (1) bracing loosened teeth, (2) crowns on anterior deciduous teeth, (3) as partial abutments, (4) as thumbsucking appliances (fixed-crib and spur-type), and (5) in minor orthodontic movements. The versatility and usefulness of the steel crown has been illustrated and its importance as a feature in the practice of pedodontia has been demonstrated.

504 *Carver Building*

Sterilization of Dental Equipment with Particular Reference to Local Anesthetic Materials

ROBERT V. WALKER, D.D.S.

Sterilizing Anesthetic Syringes and Needles

The conventional metal syringe is not difficult to sterilize for it infrequently becomes heavily contaminated and can be cleansed easily with a brush, detergent, and water, before autoclaving. When cleaning, particular attention should be given to the threads of the hub and the movable plunger which contacts the cartridge diaphragm.

Important First Step — Cleansing the needle prior to sterilization by autoclave is probably the real key in the whole sequence of sterilizing injection equipment. A minute remnant of mucus, blood, or debris in the lumen might harbor the organisms which eventually could lead to morbid post-injection complications. The lumen can only be cleared and cleansed properly with a stylet. This should be done following each injection.

Disposable Needles Available — Needles are now available in the popular small gauges packaged as sterile disposable units. The needle is used once and is discarded. This disposable item offers the utmost in needle sharpness, convenience, and sterility—and a degree of assurance, not measurable in a monetary sense, that the finest has been provided for the patient's comfort and protection. The cost of these needles is minimal.

Autoclaving Anesthetic Cartridges

Sterilization of the anesthetic cartridge's outer surface has been managed in various ways, all probably within the bounds of medico-legal protection. Perhaps the most popular method has been by immersion of the cartridges in chemical disinfectants. As mentioned earlier a chemical disinfectant in itself does not ensure sterilization. To assure complete sterilization of injection equipment, the cartridge should be sterilized by autoclaving.

Effect of Heat on Cartridge Contents—Experimental studies by competent anesthesiologists and bacteriologists have shown that heat causes little loss of potency in most anesthetic solutions. Vasopressor agents have also been studied after being subjected to autoclaving temperatures.

Loss of Potency Experienced — Epinephrine in particular has been shown to suffer incremental percentage loss of potency (as determined by bioassay recommendations of the United States Pharmacopoeia XIV) at the rate of 8, 19, and 22 per cent at one, three, and five autoclavings respectively, at 248.° Fahrenheit for 15 minutes. These percentage losses of potency may seem high, yet it has not resulted in faulty clinical performance of anesthetic injections evaluated through continued use of the method over a two-year period. It is not intended that this technique be used for resterilizing partly used anesthetic cartridges. Partly used cartridges should never be reused.

Adapted from *Journal of the American Dental Society of Anesthesiology* **8**:52 (February) 1961.

The Effective FRENECTOMY

JOHN B. PUCKETT, D.D.S., El Paso, Texas

DIGEST

This article presents a step-by-step procedure for completing a frenectomy which eliminates diastemic tissue that has persisted into adulthood.

Inadequate Definition

The superior labial frenum is a ligament that is not clearly defined in anatomy books. These definitions state that the insertion is the labial mucosa of the upper lip, directly behind the philtrum on the facial side, and the origin is a fan-shaped series of ligamentary fibers arising on the anterior of the incisal papilla. This is a rather free interpretation of *Gray's Anatomy*,[1] Cunningham's *Manual of Practical Anatomy*,[2] and Taber's *Cyclopedia*:[3]

Actual Condition Encountered — The "fan-shaped" ligamentary fibers have a tendency to extend themselves into a broad muscular-like ligament with its origin deep in the incisal papilla.

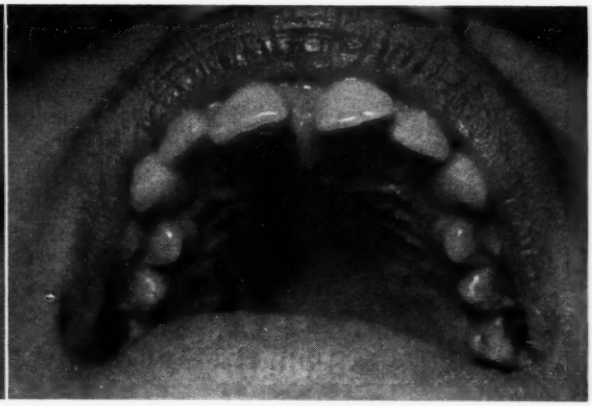
Cause of Surgical Failure—Waldman[4] in a recent article states that the excision of the labial frenum is a useful operation in the solution of an esthetic, a periodontal, and orthodontic problem; but many operations ultimately fail because the fibrils between the upper centrals have not been taken

[1]Gray's Anatomy, ed. 25, Edited by Goss, 1948, Philadelphia, Lee & Febiger, p. 1152.
[2]Cunningham's Manual of Practical Anatomy, Head and Neck, Edited by J. C. Brash, England, Oxford University Press, p. 275.
[3]Taber, Clarence W.: Cyclopedic Medical Dictionary, ed. 2, Philadelphia, F. A. Davis Company, 1943, p. F-38.
[4]Waldman, David: Sliding Flap Tension-Reducing Frenectomy, DENTAL DIGEST **66**:158 (April) 1960.

1.
Preoperative view, showing diastema.

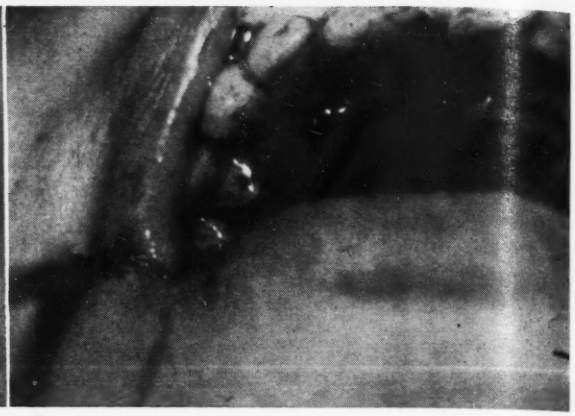
2.
Lip extended, exposing the frenum.

3.
Frenum severed, lip extended to show that in this case no additional relief-cutting is necessary. Hanging tip was subsequently removed as part of the operation.



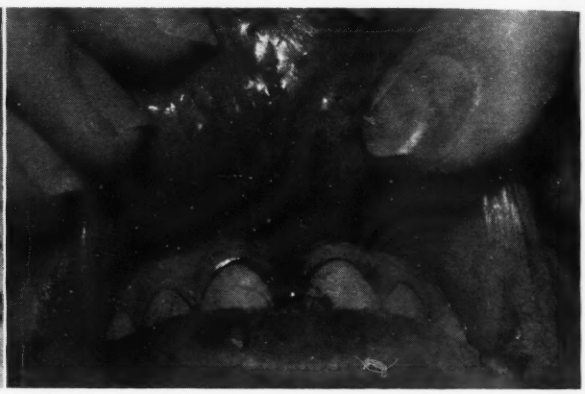
4.
Showing attachment of frenum to incisal papilla.

5.
Incision to depth of bone, to, and around incisal papilla.



6.
Excision, palatal view.

7.
Diastemic frenular tissue.



8.
Labial mucosa sutured and with dressing applied. Palatal suturing is unnecessary.

into consideration in the surgical procedure.

Frenotomy an Uncomplicated Procedure

The *frenotomy*, as distinguished from the *frenectomy*, is a simple operation: the lip is extended to display the extent (Fig. 1) and depth of the webbing (Fig. 2); this band or triangle is excised (Fig. 3). Further tension of the lip indicates the necessity of relief-extensions of the cuts.

Method to Complete Frenectomy

The surgical procedure that has been described is more or less routine and has been done many times. The true frenectomy, however, is more ex-

9.
Centrals and gingiva are covered with dry foil for protection.

10.
Postoperative view. Removal of labial sutures.

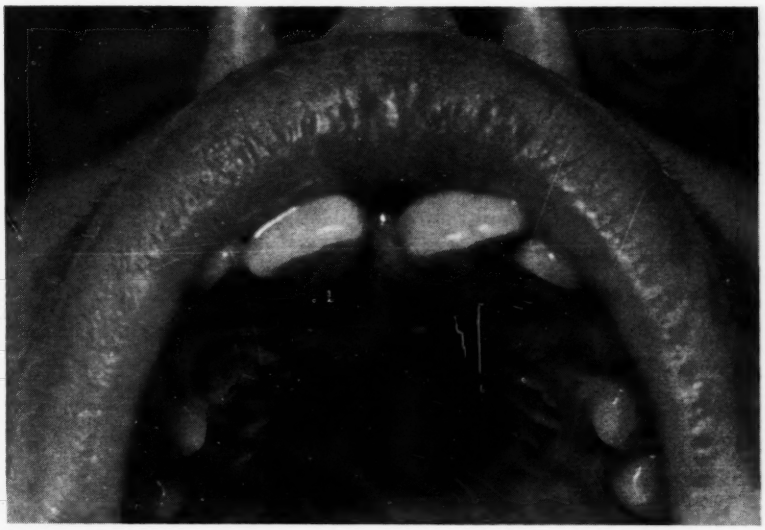
tensive: If there is no diastema present, the need for the subsequent steps is not at first obvious, but experience demonstrates that the same procedure should be followed in nondiastemic as in the obviously spaced areas.

Steps in Procedure—1. The mass of tissue between the centrals is excised from the incision of the frenotomy through the landmark of the incisal papilla. In Figure 4 this region is indicated as the lighter area between the centrals running like a peninsula into the palatal rugae.

2. The cut is made at the outer edges of this region, to the *bone* of the alveolus, labially, and to the bone behind the incisal papilla, palatally (Fig. 5). In this manner, all of the fibrils can be accounted for, as the bone has been stripped clean of the tissue, ligamental or gingival (Figs. 6 and 7).

3. The labial portion of the wound is closed with sutures (Fig. 8), the alveolar mucosa both labially and palatally is covered with a surgical dressing. Getz-400, Abbott's Dental Ointment are suggested for surgical dressing.

4. The centrals and gingiva are covered with dryfoil to hold the clot and the dressing in place (Fig. 9).



11.
Postoperative view three days after surgery.

5. Three days is usually sufficient for healing; at this time if the nonabsorbent sutures are loose enough for the edge of the scissors to slip under, they are removed, (Figs. 10 and 11), otherwise an additional two or three days of healing may be required before the sutures are removed.

Comment — The reason that so many frenectomies fail is that the diastemic tissue (Fig. 7), originally between the incisors, refuses to compress with the normal mesial drift of the expanding occlusion of children and maintains the diastema into adulthood. The method described in this article eliminates this condition.

1501 *Arizona*

Vesicular Stomatitis and Exanthem

ROBERT L. MAGOFFIN, M.D., M.P.H., EDWIN W. JACKSON, M.D., M.P.H., and

EDWIN H. LENNETTE, M.D., Ph.D., Berkeley, Calif.

Syndrome Associated with Coxsackie Virus, Type A16

An unusual illness of children characterized in a typical case by slight malaise, fever, and discrete vesicular lesions in the mouth and on the hands and feet, occurred in many areas of California and possibly other western states, during the summer of 1959. In 33 cases observed in this study, the oral lesions resembled those of herpangina, but the syndrome was distinguishable from herpangina by the frequent presence of lesions on the buccal mucosa and tongue and also, in 8 cases, by the presence of a maculovesicular exanthem. Evidence of infection with a Coxsackie virus, group A, type 16, was found in 11 of 15 cases in which viral studies were done. This syndrome is not known to have been recorded previously in the United States, but a localized outbreak of a similar disease, likewise attributed to Coxsackie A16 virus, occurred in Toronto, Canada, in 1957.

From *Journal of the American Medical Association* **175**:117 (Feb. 11) 1961.

A TECHNIQUE FOR CEMENTATION

of Full Coverage Restorations

VICTOR C. AUTH, A.B., D.D.S., South Orange, New Jersey

DIGEST

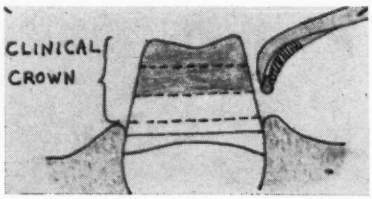
This illustrated article presents a step-by-step technique for permanent cementation of full coverage restorations utilizing zinc phosphate cement.

Application of Mixed Cement to Interior of Casting

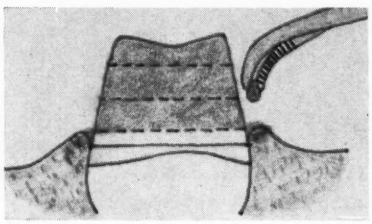
After an abutment tooth has been effectively desensitized and provision made for a clean, dry field the next consideration would be that of the cementation procedure proper.

Cementation Procedure — When a satisfactory mix of cement has been made, that is, one in which the mix is uniform and falls from the spatula like thick cream, it may be applied to the internal surfaces of the casting which have been previously treated with alcohol for sterilization and drying. For most single crowns four or five drops of cement liquid will usually be enough to make an adequate quantity of cement mix.

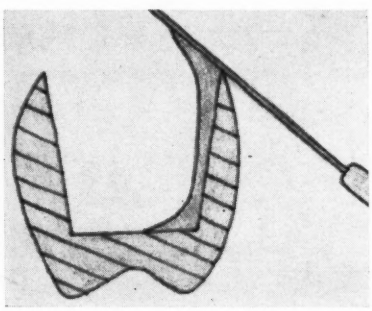
Method to Avoid Air Bubbles — When placing cement inside most crowns either a slender cement spatula or a plastic instrument of convenient size may be employed. The aim is to fill quickly the entire casting with cement without trapping air bubbles. This is best accomplished by allowing the fluid cement mixture to run down the side of the crown to the occlusal or incisal area (Fig. 3) and then gradually adding more and more cement until the gingival marginal areas are reached (Figs. 5 and 6). An attempt to place the cement directly into the interior of the crown (Fig. 4) and then build up to the gingival margins will probably trap air bubbles and these will of course prevent proper seating of the crown when it is placed on the abutment tooth.



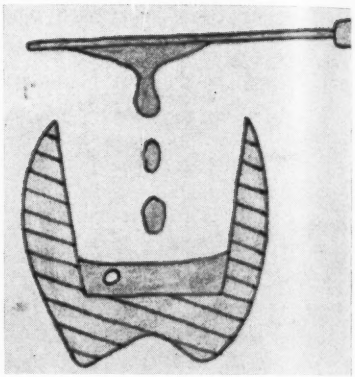
1.
Correct procedure for applying silver nitrate to abutment for purpose of desensitization. Note that marginal gingival areas are not involved.



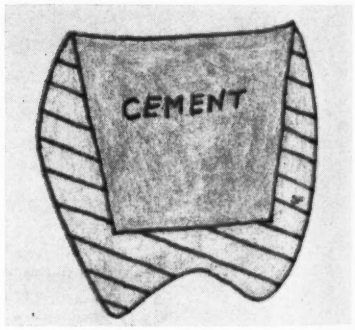
2.
Incorrect procedure for applying silver nitrate to abutment for purpose of desensitization. Note that in this case the marginal gingival areas have been injured by careless application of medicament too far gingivally.



3.
Correct method of applying mixed cement to interior of crown.



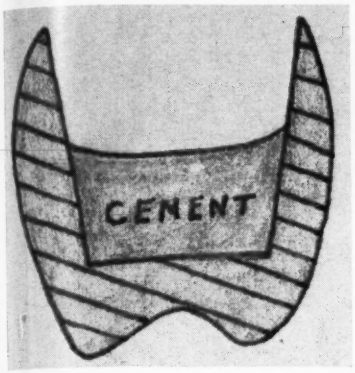
4.
Incorrect method of applying mixed cement to interior of crown. Note trapped air bubble within cement body.



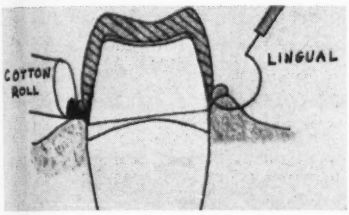
5.
Crown filled to correct height with cement internally.

Important Considerations in Cementation Procedure—The important things to consider when loading a crown with cement are the following:

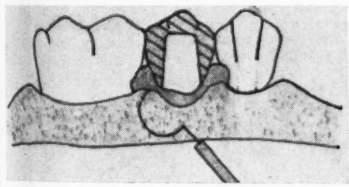
1. Apply cement down along side of crown in increments
2. Take care to avoid trapping of air bubbles
3. Fill crown completely with cement



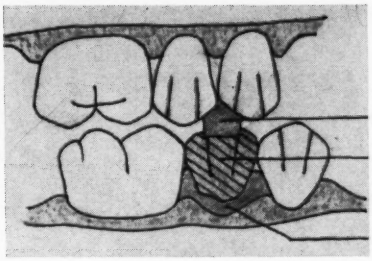
6.
Crown filled to incorrect height with cement internally. This amount of material will not provide sufficient excess for proper cementation.



7.
Incompletely seated crown. Note that a portion of a cotton roll has been trapped under the buccal margin of the crown. This is confirmed by poor marginal adaptation of the casting to the abutment on the lingual.



8.
Testing full crown on a mandibular second bicuspid for completeness of seating with No. 23 explorer. Margins are inspected immediately after placement of the crown on the prepared tooth before the cement begins to set. If there is need for correction the crown may still be removed with relative ease and recemented.



9.
Technique of having patient bite on orange or cottonwood stick following permanent cementation in order to maintain constant pressure and rigidity until material has set.

Seating of the Casting

1. After the casting has been adequately filled with cement it is placed upon the prepared tooth and pushed to place with finger pressure at first.

2. A mallet and orange wood stick are used to force the crown carefully into correct position.

3. If the crown is on a mandibular tooth the patient is instructed to support his jaw with his hands during this phase so that the malleting will not cause temporomandibular joint dysfunction or place undue strain upon the muscles of mastication.

4. When the casting is considered to be completely seated the operator should check the gingival area to be sure that no remnants of cotton rolls or other debris have been trapped beneath the crown margins (Fig. 7). Before the cement begins to harden the crown-tooth margins should also be checked to determine the completeness of seating (Fig. 8). Inaccurate seating of the crown may require its removal and recementing.

5. When the crown is in correct position it is necessary to maintain constant pressure on it during the setting interval. This may be done by having the patient close on a cotton or orange wood stick placed between the crown and its opponent tooth in the opposite arch (Fig. 9). This may require eight to ten minutes.

Removal of Excess Cement

It is not advisable to attempt to remove excess cement from around crown margins while the cement is still in a fluid state. It is preferable to wait until setting has occurred and then chip away the excess with an explorer or excavator. Placing a little petroleum jelly on the interproximals of castings before cementation will facilitate cement removal in these areas.

During removal of excess cement it is especially important to be sure that bits of cement have not been left in the gingival sulcus. Cement particles carelessly left in this area act as an irritant to gingival tissue and may produce inflammation, pocket formation, and possible recession with an undesirable exposure of crown margins. Thus a careful examination of all gingival sulci with an explorer after cementation is well worth the effort.

106 *Prospect Street*

The Hinge-Bow and the Face-Bow:

AN EVALUATION

HARRY L. PAGE, Valparaiso, Indiana

DIGEST

This article is a comparison between the hinge-bow and the face-bow and the application of these devices to temporomandibular joint articulation. The function of the face-bow is discussed and the reasons for its limitations in use are presented. The purpose of the hinge-bow and the later modifications that have made possible the solution of mechanical problems and the highly accurate results obtained in its use are described.

Concept of Hinge-axis

In 1926, the Gnathological Society of California under the leadership of B. B. McCollum[1] introduced the hinge-axis theory to dentistry. That the temporomandibular joints rotated around an axis, or axes, was not a new concept. The medical profession had long accepted the fact that a temporomandibular joint was ginglymoid as well as diarthrodial. For over 2000 years, it had been common knowledge that every existing mass that rotated while bearing against another mass did so around some form of axis.

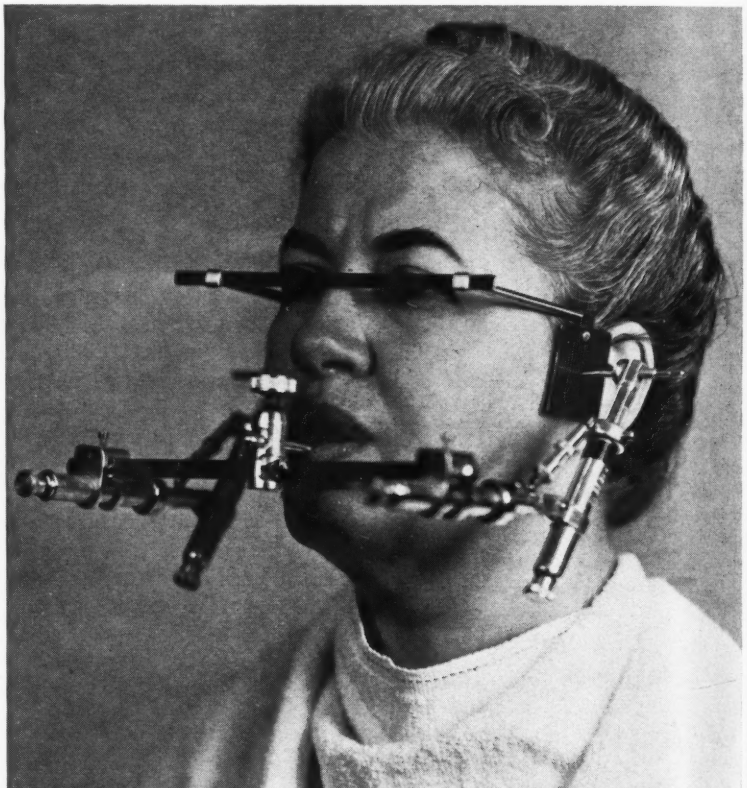
Several Axes Involved—It was also common knowledge that an irregular mass, such as a condyle, does not rotate continually on the *same* axis. It picks up a succession of *different* axes inherent in its bearing (in this case, the fossa), each axis carrying what is, for all practical purposes, a uniform arc through a considerable number of degrees.

Only Certain Axes Needed—In articulation and occlusion of teeth, only axes that are in control of the arc during final closure (the terminal functional orbit) are needed. These are readily determined and thoroughly practical.

Application to Temporomandibular Joint Articulation — Although there was nothing new in the hinge-axis *concept*, what *was* entirely new was the practical application in dentistry. The noted physician, Sir William Osler, said that it is not the discoverer who deserves credit so much as the one who makes the discovery available for use. McCollum and his California group had the required perception and initiative to make it available.

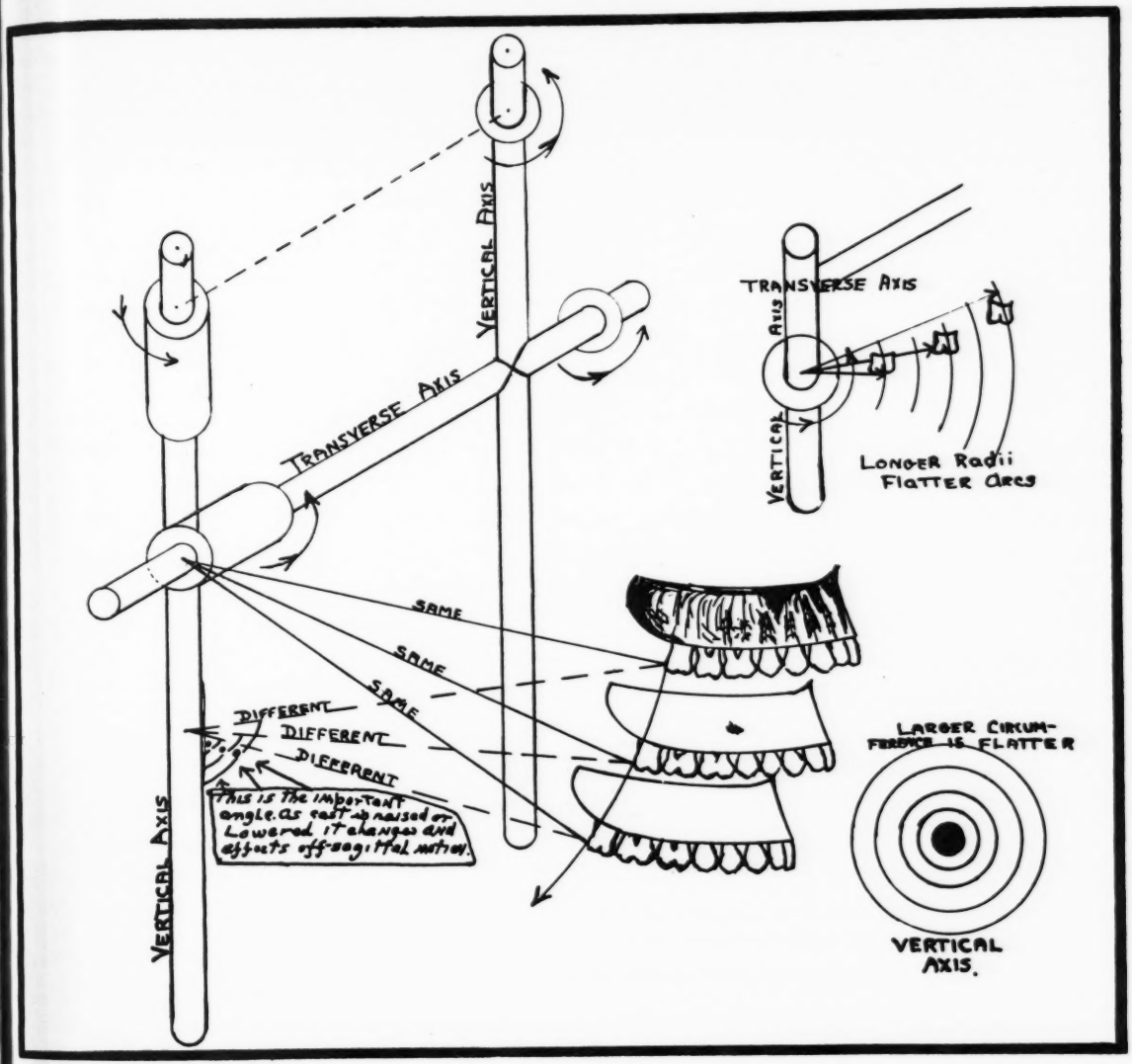
Obsolescence of Face-bow

The instrument for recording temporomandibular joint transverse hinge-



1.
The hinge-bow is rigidly fixed to the moving mandible by a two-way clamp and intraoral, universally adaptable clutch. Hinge pins turn against graphed reflector plates adjusted free of head. Spectacle side bars grip cranium automatically at muscle-free areas.

[1]McCollum, B. B.: Fundamentals Involved in Prescribing Restorative Dental Remedies. 1941 Reprint from Dental Items Interest, June, 1939 to February, 1940, p. 6.



2.

Unless a cranial plane, recorded on the head, serves to stop the swing of the bite fork at the correct angulation between the maxillary occlusal plane and the vertical axis in the articulator during mounting, the perpendicular radius (not shown) from the vertical axis to any given tooth will be wrong. After the mounting, any articulator with condyle balls on the upper frame will disrupt the radius (as shown) from the vertical axis to any tooth in simple opening and closing. In either event lateral components of function will be incorrect.

axes, known variously as an adjustable face-bow, a kinematic face-bow, a hinge-axis bow or, simply as a hinge-bow (Fig. 1) was the logical successor to Snow's face-bow and all face-bows that followed it. Snow's idea was sound; namely, an attempt to duplicate the radius from each temporomandibular joint to the fixed maxillary occlusals in an articulator.

Reasons for Failure—The original face-bow was and is a failure for two reasons:

1. The first reason for failure was that there was only a vague understanding of its purpose among those who tried to use the face-bow at the time it was introduced. Nor is the situation much better today. In his current book, Shore[2] credits the face-bow with establishing ". . . three planes of reference; vertical, horizontal, and anteroposterior." There are no such things as "vertical" or "anteroposterior" dimensional planes. According to this kind of mathematics the spokes of an automobile wheel could establish the tridimensional ups, downs, and curves of the road over which it rolls, or the walls and floor of the garage in which the car is housed.

2. The second reason for the failure of the face-bow is its inherent inaccuracy. Not only is the face-bow inaccurate because it provides only a gross approximation of the radius from each joint to the maxillary occlusals but, also, the "relationship" is valueless because it is a static "relationship" one good nowhere except at the exact relative positions of the oc-

[2]Shore, Nathan A.: Occlusal Equilibration and Temporomandibular Joint Dysfunction, J. B. Lippincott Co., 1959, p. 93.

3.
Conventional face-bow connecting an arbitrary joint-axis position (12 millimeters from tragus on line to eye corner) to the stationary maxillae. True transverse axis is indicated by a black dot on the anterior rim of the ear. All opening and closing components except the one mounting position will be wrong.

clusals in space when recorded. The necessary removal of the occlusal record from between mounted casts in order to allow closing of the dentulous lower against the upper destroys this "relationship." So does setting up the teeth for the edentulous upper and lower.

Meaningless Term — This inaccuracy of the face-bow is one of the reasons why so-called "centric relation" is meaningless for "centric relation" and "centric occlusion" are completely dependent upon maintenance of the jaw separation at which the recording was made. Even with the face-bow, the necessary change in jaw separation brings disastrous results to simple opening and closing. This is tacitly acknowledge by the general insistence that an exact "vertical dimension" *must* be maintained; a rare accomplishment in conventional methods if the constant need for extensive postoperative occlusal adjustments and frequent remakes is any indication.

Collateral Error — The face-bow makes no provision for duplicating the radii from the vertical axes of the temporomandibular joints of the occlusals of either jaw. Consequently, all lateral components of function made in the articulator are hopelessly faulty. This was illustrated perfectly by Schweitzer[3] (Fig. 2). Nor does the face-bow provide radii from the sagittal axes to the median line. Hence, all rocking components of the jaw are also inaccurate in the articulator.

Purpose of Hinge-bow

The hinge-bow meets with persistent opposition principally (and oddly enough) from those who endorse and use the face-bow. It would seem that this opposition must have its source in misunderstanding the purpose for which the face-bow, itself, was designed. There seems to be no realization that the face-bow represents only an attempt to establish a *radius* and nothing more than a radius between the stationary temporomandibular joints and the equally immobile maxillary occlusals (Fig. 3). It must be re-emphasized that the only possible use of the face-bow is to establish a one-positional "relationship in space."

Essential Positions Related — The hinge-bow cannot establish a tridimensional relationship either but it is far superior to the face-bow because it relates, not just one but *all* essential positions on the closure arc of the lower jaw to the transverse rotational axes in each temporomandibular joint. At the same time, it establishes accurately the fixed radius from these same axes to each upper tooth; a radius that corresponds exactly with the closing radius of each lower opponent as the latter arcs into occlusion.

Problem Solved—With control of the jaw's closure arc, the vertical dimension or jaw separation, so vital to "centric relation," ceases to be a problem. Muscle tolerance and esthetic values are still to be considered but these are far simpler when accurate interdentation in closure will not be affected by changes in vertical dimension. This is one of the great advances contributed by the hinge-bow.

Hinge-bow an Improvement—If the face-bow is really understood by its proponents, it is hard to understand why they would disparage the hinge-bow. Rather they should acclaim it. McCollum and his associates did not join in the general misinterpretation of Snow's idea. They saw excellent possibilities if Snow's face-bow could be made more accurate. This meant exact radii from the joint rotation centers to the occlusals of *both* jaws (especially the moving lower jaw) instead of a gross approximation to the occlusals of the upper alone.

Facilities Needed—The first crude experiments showed that consummation of the idea was feasible. But the

[3]Schweitzer, Jerome M.: The Transograph and Transographic Articulation, J. Pros. D. **7**:617 (Sept.) 1957.

face-bow proved to be too clumsy to be practical. Facilities were needed for rigid attachment of the bow to the lower jaw so that the two could be moved as a unit. It was also found necessary to make the arms of the bow independently adjustable; for the axes in the opposite joint invariably proved to be asymmetrically positioned.

Accuracy Obtained — With independently adjustable side arms carrying the axis indicator pins or "calipers," each pin could be moved in any desired direction until it was zeroed over its corresponding transverse axis. These mechanical problems were soon solved with the result that recordings became far superior. Where, then, is the basis for disparagement of the hinge-bow by face-bow users? It is illogical for someone to oppose an *improvement* on a mechanism that he has already endorsed.

104 *Garfield Avenue*

An Edible Dental Prop

MASSEY DAWKINS, M.D., F.F.A., D.A.

Traumatic Experience

A small child is naturally apprehensive on being told that he is to have a tooth out, despite reassurance that he will be asleep and feel nothing. The production of a strange object—the prop—whose purpose he cannot be expected to understand, does nothing to allay his fears. He is perhaps told to "bite on this piece of tin toffee." He bites, and on finding that it is not even remotely like toffee, he rejects it. Attempts to replace it result in screams, which are intensified on the approach of the mask. Only too often the anesthetist in desperation forces the mask on his face despite his struggles. Anesthesia is eventually achieved. A fresh struggle ensues to insert a gag between the clenched teeth, often ending in trauma.

Experiments with Prop

It seemed that if a prop could be made to look and taste like a sweet and at the same time efficiently hold the jaws apart without slipping, much would be gained. Taking the McKesson rubber prop as a model, attempts were made at first with wine gums, liquefied and poured into a mold. But this proved too sticky and ordinary lozenge paste was substituted, which proved satisfactory. This has a pleasant taste, can be made in any color, is hard enought not to fragment, and can be produced as a perfect model of the original. A hole is bored through the middle to take a piece of tape to prevent accidental ingestion.

Sweetened Prop Welcomed — The majority of children will readily accept such a prop and it is not easily dislodged during induction. After anesthesia, the prop is washed, the tape removed and it is handed—as promised — to the child in the recovery room. It is remarkable how many crying children become quiet directly they get their sweet.

Rationale for Use of Sweet—It may reasonably be argued by the dental profession that this will appear contradictory to their campaign to stop caries due to excessive sweet consumption. But the sweet might be used as a prize to reward the child for his cooperation with the dentist.

Adapted from *Journal of the British Dental Association* **110**:315 (May 2) 1961.

Disturbances of the Temporomandibular Joint

Associated Causes

Temporomandibular joint pain and associated facial pain have a multiplicity of causes. The majority of patients fitting this category are tense, and nervous and also have some dental or occlusal disharmony. Spasm of the muscles of mastication with resultant trismus often occurs.

Distribution of Pain—Pain of mandibular joint origin will always be manifested initially in the preauricular area. Distribution of pain can then be transmitted via the auriculotemporal nerve which supplies the capsule and meniscus.

Indication for Surgery—A meniscectomy is indicated when there is repeated dislocation of the meniscus with blocking of the condylar head, preventing anterior movement. Tearing of the meniscus or partial erosion in acute traumatic episodes with resultant persistent cracking, noises, and persistent pain with progressive interference of function should be treated surgically.

Comment

Any patient with undiagnosed temporomandibular joint facial pain should be told of the probable association of the pain with occlusal disharmony and muscle spasm and with its precipitation on a psychogenic basis. Sedation or use of tranquilizers in conjunction with therapeutic procedures is probably the most satisfactory treatment.

Adapted from *Journal North Carolina Dental Society* **44**:114 (January) 1961.

Rebasing

PARTIAL DENTURES

HAROLD S. JONES, D.D.S., Allentown, Pennsylvania

DIGEST

When a partial denture is rebased and the result is not satisfactory it must be considered a failure. The all-important factor in a rebasing procedure for a partial denture with clasps, is that the clasps must retain their correct positions. The technique presented here describes a method to prevent failures in rebasing techniques.

Rebasing Partials with Clasps That Have Rests

Before altering the saddle areas of the partial for the impression material be certain that all occlusal rests and clasps are in their proper positions when finger pressure is applied to them. The same pressure should be applied as that used when the impression is taken.

Trim out the saddles the amount desired for the impression material and again with finger pressure test to determine that the rests and clasps are in proper position.

Impression Material—The impression material should not be too soft but should be of a medium consistency to encourage the directional flow of the material. The rubber base impression material Thiocol® is recommended. The following precautions should be observed in using Thiocol:

1. The two ingredients of Thiocol must be mixed until a uniform color is attained.

2. An adhesive preparation is applied to the prepared surfaces of the saddles including the periphery and extending beyond.

3. The time required for the setting of this material is considerably longer than that for other materials. Four minutes at least is required and steady pressure must be maintained.

4. Do not attempt to remove any excess of the Thiocol under the clasps or against the abutment teeth; this material is elastic and distortion would result.

5. Elastic impression materials are pliable and distortion of the edges of the impression may occur while pouring the model. Protect against distortion by immersing the denture up side down in soft plaster to the extent needed to support the edges.

Taking the Impression — For this procedure the following steps may be taken:

1. Apply the impression material in the saddles and with finger pressure only on the occlusal rests insert the denture in place. Maintain this pressure until the material is set. No occlusion of the teeth is possible while maintaining finger pressure.

2. Pour the model and have the denture processed. When inserting the finished denture check for impingement of any cervical areas of the abutment teeth and note the position of the occlusal rests and clasps.

3. The occlusion of the denture may now be noted and corrected.

Rebasing Partials with Clasps That Have No Occlusal Rests

Before altering the saddles ascertain that the positions of the clasps and bar are absolutely correct.

Making the Matrix — The matrix may be made in the following manner:

1. Remove the denture and burnish tin foil 1:1000 thickness over all the remaining teeth that are included with the clasps and bar.

2. Reinsert the denture over the tin foil. The clasps will now be a degree tighter and will aid in determining the precise positions of the clasps and bar.

3. Apply soft plastic material (tray plastic) with a brush over the occlusal areas of the abutment teeth engaging the clasp to the tin foil (Fig. 1).

4. Extend the plastic down the lingual areas to engage some of the bar.

5. Do not apply plastic to the buccal or labial areas of the clasps in the region of the springy part of the clasps which would prevent its removal.

6. Allow no occlusion while the matrix is being made. Allow ample time for the plastic to set.

7. Remove any excess foil that may be present over the remaining incisal edges to prevent buckling when reinserted.

8. The denture, plastic matrix, and tin foil are removed in one piece and reinserted to ensure that the matrix returns to its exact place.

9. The saddles are trimmed for the impression material and again the denture and matrix are inserted. This is the final examination for proper functioning of the matrix.

Final Steps—1. The impression material is prepared and applied to the saddles and pressed to place with finger pressure on the top of the matrix over the abutment teeth. Pressure is maintained until the material sets.

2. Remove the denture and pour the model. The plaster matrix will be removed after the model is made.

3. Process the denture, check for impingement of cervical areas, and then test the occlusion.

Rebasing Partial Dentures with Self-Curing Plastic

When rebasing a partial with clasps with self-curing plastic two difficulties must be overcome:

(A) The irritation of the mucosa from the wet plastic material.

(B) Placement of the clasps and rests in the manner described.

The denture is checked for the positions of the rests and clasps or with no rests; a matrix is made. The saddles are prepared and the following procedure is completed to avoid irritation of the mucosa by the wet plastic.

Preparing the Self-Curing Plastic— The mixed liquid and powder ingredients of the plastic material must remain in a container with a sealed top until the mass is of a putty-like consistency. From this point on, timing the steps in the procedure is extremely important to prevent setting of the plastic before it is properly shaped as the final impression.

Procedural Steps — 1. Apply the putty-like plastic to the saddles, immerse the denture in cold water for a minute, and begin to observe the tackiness of the mass. When the mass is of consistency to be touched with a dry finger without sticking it is ready for insertion.

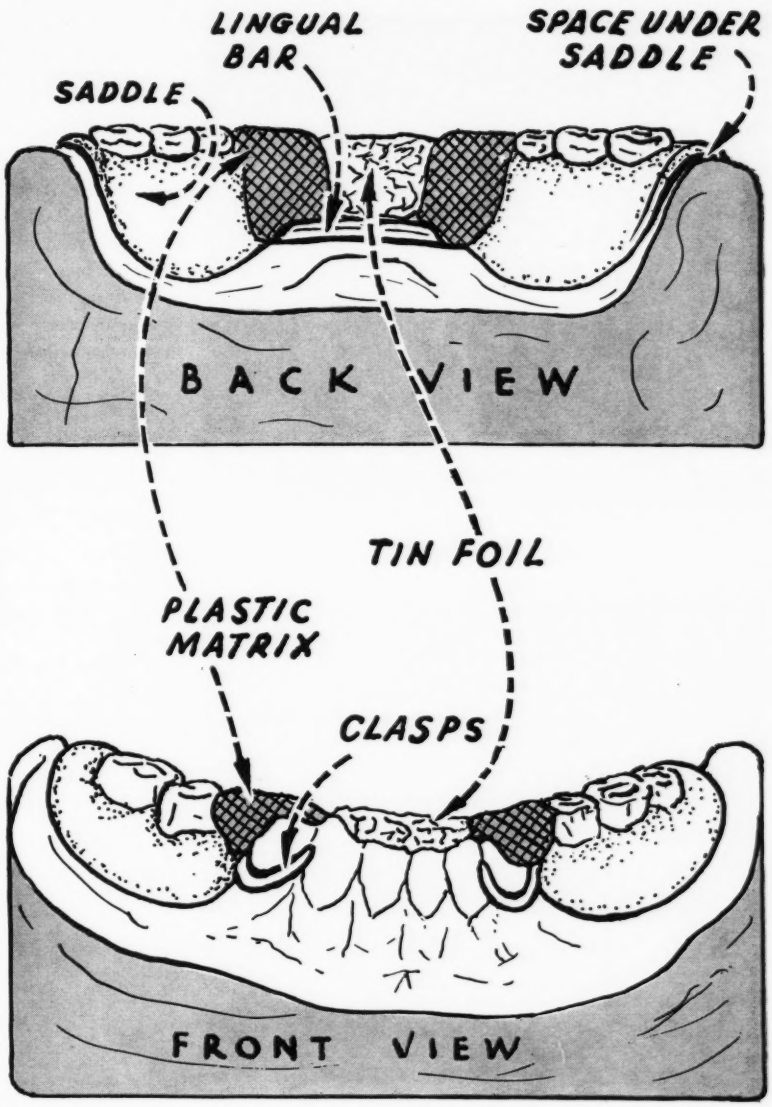
2. Insert the denture, but do not press it completely in place. Remove it promptly. This is the first check of the plastic for stickiness. Immerse it in cold water for the second time for a few moments. Reinsert the denture and this time press it in place with finger pressure on the rests or matrix. Again remove promptly and give it a third water bath.

3. Determine at this time that the bulk of the material is properly placed in the saddles. If it is not, correct its position. Reinsert the denture and maintain pressure on the rests or matrix until the patient when requested reports the first indications of an irritating sensation. Remove the denture promptly and place it in the water bath for the fourth time for a few moments.

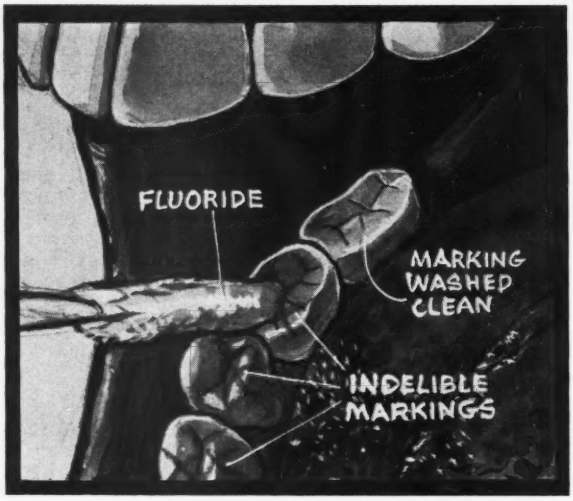
4. Return the denture to the mouth and press in place in the same manner and again ask the patient to report irritation. This procedure (promptly removing the denture from the patient's mouth when irritation occurs, immersing it in water, and returning it, always placing it with finger pressure only) is repeated until the plastic is set. This method of curing the plastic in the mouth will help to prevent warpage of the delicate edges of the denture.

5. Trim the rough edges of the denture and polish. Check for impingement of cervical areas on abutment teeth. The occlusion is corrected at this time.

1121 *Walnut Street*



1.
The anterior and lingual view of the prepared matrix is shown. Note that anteriorly the matrix does not involve the springy end of the clasps, while lingually the matrix is filled in and includes part of the lingual bar.



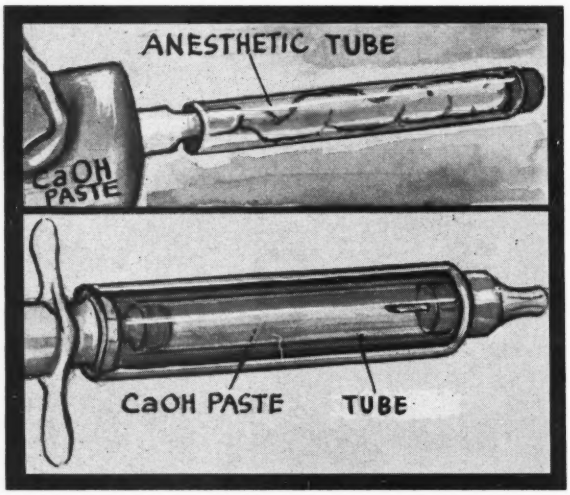
1

Clinical and Laborator

Visual Indicator for Tropical Fluoride

Henry Heimansohn, D.D.S., Danville, Indiana

1. Because fluoride solutions are colorless it is desirable to be assured that every tooth surface is included in the application. After a prophylaxis dry and isolate the tooth and mark the tooth areas with an indelible pencil. When the fluoride is applied the markings are washed away by the application of the solution.

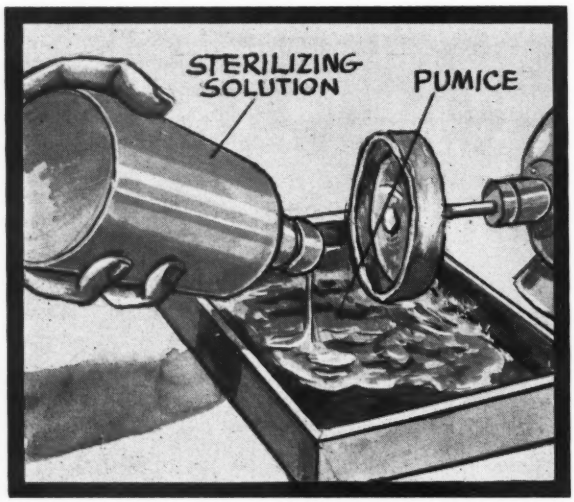


2

Placing a Calcium Hydroxide Liner

Jerome Lish, D.D.S., Brooklyn, New York

2. Remove the rubber plunger from an anesthetic tube. Clean and dry the tube and fill with calcium hydroxide paste. Replace the rubber stopper. Inject the base material into the cavity through a blunted needle.



3

Sterile Pumice

Bruno B. Kielich, Jr., D.D.S., Buffalo, New York

3. A 1:1000 solution of benzalkonium chloride added to the pumice in the lathe tray will assure sterility of the pumice.

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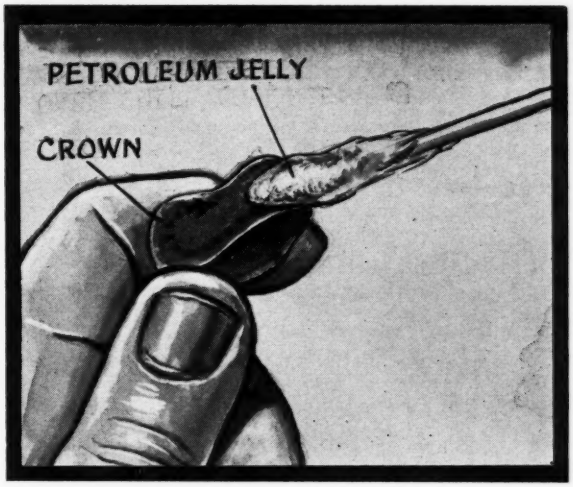
SUGGESTIONS . . .

Coating of Crowns before Cementation

Arnold M. Hoffman, D.D.S., Norfolk, Virginia

4. To facilitate removal of the hardened cement from the outer surface of a crown or bridge apply either cocoa butter or petroleum jelly before the cement is mixed.

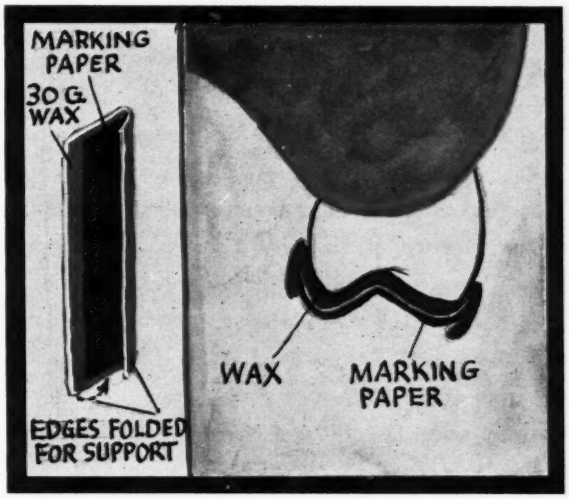


4

Adjusting an Occlusion

Lawrence Wiland, D.D.S., Flushing, New York

5. If a strip of 30-gauge wax is combined with a strip of articulating paper or marking ribbon, the wax will stabilize the marking paper on the teeth and produce a more accurate occlusal registration for adjusting the occlusion.

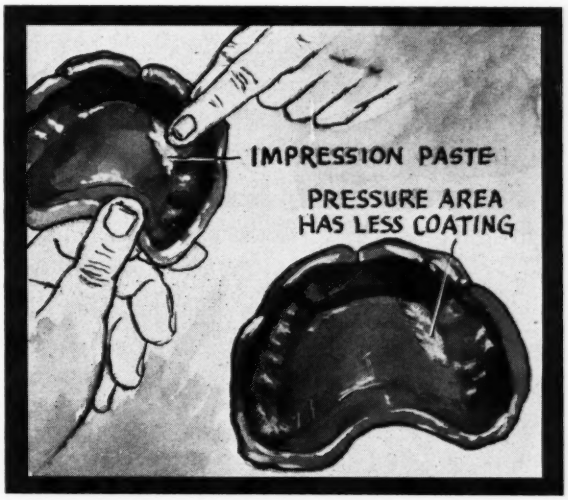


5

A Method of Locating Pressure Areas in Dentures

S. H. Rowberry, D.D.S., Steilacoom, Washington

6. Place a small amount of zinc oxide-eugenol impression cream in the denture. Seat the denture. The pressure area will show a thinner coating of the cream. Reduce this area.



6

volved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 401 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S Page

ANY surgical procedure that will reduce operating time, lessen discomfort to the patient, reduce fatigue to the operator is a procedure of merit. High-speed cavity preparation fulfills these objectives.

There are, however, some hazards in high-speed cutting that should be considered. Dangers to the patient and the dentist from air contamination during high-speed operating have been evaluated by a British investigator:[1]

"Observations on bacterial contamination during the use of the high speed drill were made by drawing air from the region of the operator's face through a slit sampler, and impinging this on a rotating blood agar plate. Samples were taken before, during, and after drilling with both high speed and conventional instruments. The periods during which drilling was performed could be identified on the plates as tooth debris could be seen in the appropriate segment. A uniform distribution of aerial contaminants was seen, the predominant organisms being *Staphylococcus albus* and a Gram-negative bacillus of the aerogenes group. Some periods of drilling were associated with a growth of *Streptococcus viridans* organisms. These were found following the use of both high speed and conventional drills, and were the only organisms to be specially associated with drilling procedures, although sampling was related to a number of patients on different days in the two dental surgeries investigated.

"From these observations, it was thought that there was no increased risk to the operator of bacterial contamination associated with the use of the high speed drill. It was found that the quantity of respirable dust produced by the high speed drill was small, especially when it was used with a water jet, and when not only the concentration, but also the total time of exposure to the peak concentration was taken into account.

"Consideration of the composition of the solid particles does not reveal the presence of any substance that might be considered to be pathogenic in the concentrations encountered. . . .

"The introduction of oil into the lung is, however, by no means innocuous. . . .

"Mineral oils produce a slower but intense fibrous tissue reaction surrounding collections of oil laden macrophages. Firm masses develop in the lung which may superficially resemble a malignant lesion, termed descriptively, a paraffinoma. Chronic respiratory symptoms are often produced. Many such cases have been described following the inhalation of liquid paraffin administered medicinally.

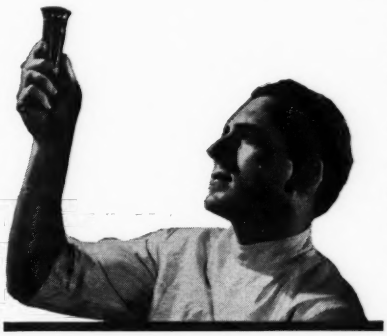
"Vegetable oils, if free from fatty acids, rarely produce an inflammatory reaction in the lung. The oil droplets are usually broken up and removed via the lymphatic system by phagocytes, so that eventually no trace of oil is left. Iodized vegetable oils are commonly introduced into the lung for radio-diagnostic purposes, and ill effects associated with these oils have rarely been reported.

"It is recommended that vegetable oils free from impurity should be used exclusively for lubricating purposes in air turbine drills. The minimum quantity compatible with efficient running of the machine should be used. If the instrument is used with a water jet there will be an appreciable reduction in air contamination with solid particles, so that apart from any consideration concerning the safety of the tooth operated upon, the safety of the dental surgeon operating the drill is also made more certain."

The patient is exposed infrequently to the oil ejected from a high-speed cutting instrument. The dentist is exposed repeatedly and the hazard is, therefore, greatly increased. Oil that enters the lungs is a distinct occupational hazard to the dentist. The substitution of pure vegetable oil for mineral oil is a simple way to prevent lung complications.

[1]Kazantzis, G.: Air Contamination from High-Speed Dental Drills, Proceedings of the Royal Society of Medicine **54**:242 (March) 1961.

MEDICINE and the Biologic Sciences



Asthma in Children

Asthma has more profound effects on children than on adults. Homeostatic mechanisms in children are labile and frequently do not protect against dehydration, acidosis, and vascular collapse.

The smaller nasal and bronchial airways become occluded readily, and the youngster often fears suffocation when dyspnea and cough are present. Fluids and medications are difficult to administer to a panicky and uncooperative child.

Idiosyncratic drug reactions, particularly to barbiturates and aminophylline and untoward effects of steroid therapy appear to be commoner in young persons than in adults. Anxiety of the child may be aggravated by the behavior of the parents. Associated infections are frequent and nutritional disorders commonly derange the effects of treatment.

The principles of therapy are (1) bronchodilation, (2) sedation, (3) adequate fluid intake, (4) removal of allergens from the surroundings, and (5) vigorous treatment of associated infection.

Parents can frequently anticipate an impending attack, particularly if factors such as respiratory infection or overexertion are known to precipitate asthma. Therefore, if parents are thoroughly instructed, treatment may be started promptly, in fact, almost before the attack begins.

Bronchodilation and sedation are instituted immediately. Hydration is the most effective expectorant. Fluids should be given frequently early in the attack before the child is too ill to drink. Allergens should be removed from the surroundings immediately. Taking the child out of the house while allergenic material is removed from the bedroom allays anxiety. Prolonged attacks necessitate stepwise introduction of more potent drugs.

Infection should be treated vigorously with a broad-spectrum antibiotic or sulfonamide until the child has been afebrile for two days. Penicillin should not be used if another drug is satisfactory because the risk of sensitizing an atopic person to the drug is considerable. If the attack persists for two days and infection is absent or controlled, steroid therapy is justifiable.

Hospitalization is rarely necessary but should be resorted to if home measures fail and the patient is dehydrated.

McGovern, John P.: Therapy of Acute Attacks of Asthma in Children, JAMA **169**:20-23 (January 2) 1959.

Staphylococcal Infections

The incidence and severity of staphylococcal infections appear to be increasing. Frequently the bacteria are resistant to antibiotics.

Outbreaks of staphylococcal infections are occurring in nurseries for the newborn. An increasing number of infections of so-called clean wounds are being reported in hospitals where antibiotics are used extensively and frequently for prophylaxis. Staphylococci are the most important secondary invaders in persons with debilitating diseases, unconscious patients, and patients receiving antibiotics for other types of infection or continuous steroid therapy. Antibiotic-resistant staphylococci are also being recovered with increased frequency from persons who have never been in a hospital and are not in contact with recently discharged patients.

Sulfonamide drugs appear to have little if any effect against serious staphylococcal infections. Gramicidin and the related tyrothricin can be used only for superficial infections because of systemic toxicity and direct hemolytic effects of the drugs.

The usefulness of penicillin, which was initially effective against virtually all pathogenic staphylococci, has been reduced by two factors. Many strains now produce penicillinase and, therefore, are resistant to the antibiotic, and the incidence of hypersensitivity reactions is increasing.

Penicillin-resistant strains now constitute 60 to nearly 100 per cent of all pathogenic strains of Staphylococcus aureus isolated from infected sources or from healthy carriers among hospital personnel.

If the pathogenic strain is sensitive, penicillin V or G by mouth or solutions of potassium or sodium penicillin G injected intramuscularly may be effective when given early in the course of infection. Of the repository forms, large doses of the aqueous suspension of procaine penicillin may be used, particularly after the acute febrile phase has subsided.

Streptomycin is occasionally helpful as an adjunctive agent in the treatment of staphylococcal infections. The antibiotic may delay onset of resistance to the other agent and enhance bacterial activity.

Effects of two antibiotics are usually synergistic. Synergistic action is entirely unpredictable and can be detected only by in vitro tests.

Finland, Maxwell: Antibiotics for Staphylococcal Infections, M. Clin. North America **42**:1179-1194 (September) 1958.

(*Continued on page* 388)

Pleural Effusion

Pleural effusion is often a manifestation of a disease with a serious prognosis. The cause of fluid formation, therefore, should always be determined, even if the effusion and symptoms are transient.

A chest roentgenogram should be made if a patient has chest pain without respiratory movement. Another film should be made after two weeks to detect late effects. Signs of effusion include dullness by percussion, decreased breath sounds, and vocal fremitas.

One should ascertain whether the onset is insidious or abrupt and whether the patient had pleuritic pain or pneumonia. Also of importance are the concurrence of chills, fever, cough, dyspnea, and hemoptysis. Tuberculin and fungous skin tests are performed. The white blood count, differential count, the sedimentation rate, and urinalysis may provide diagnostic clues.

A sample of the effusion should be aspirated and transferred to a sterile bottle. Cell counts, cytologic evaluation, and cultural studies for tuberculosis, other bacteria, and fungi are done with the centrifuged sediment of the pleural fluid. Only two findings are diagnostic: cytologic demonstration of malignant disease, and a positive bacteriologic culture.

Fluid formation in the pleural cavity results from alterations in the pleural fluid dynamics or from the vascular inflammatory reaction produced by disease invading the pleural space or areas adjacent to the pleura.

Tuberculosis should be considered when effusion appears insidiously, especially if the patient is young. Fatigue, weight loss, and low fever often accompany the effusion. The reaction to the tuberculin test is usually strongly positive. The tubercle bacillus does not remain free in the fluid for any great period of time. As a result, bacteriologic diagnosis can be made by culture of aspirated fluid in only about 30 per cent of cases. Needle biopsy will usually yield sections in which specific granulomatous areas can be identified.

Fungus infections may not be distinguishable from tuberculosis either by clinical course or by histologic examinations. Culture of biopsy material, skin tests, and complement-fixation examinations may be useful. Skin reactions for fungus infections are frequently negative, even with active disease.

Malignant effusions frequently increase unrelentingly. The character of the fluid varies, depending upon whether effusion is caused by invasion of the pleural cavity by the tumor or by pressure changes from vascular obstruction by tumor. With direct invasion, the fluid has a higher specific gravity, is often bloody and frequently contains malignant cells. Needle biopsy is positive in less than 50 per cent of this group because the tumor is usually disseminated.

Sweany, Stanford, K.: The Significance of Pleural Effusion, Illinois M. J. **116**:123-128 (July) 1959.

Determining the Time of Death

Estimation of the time elapsed since death is based on the following physical alterations: ocular changes, livor mortis, rigor mortis, and putrefaction. Pertinent external variables include the ambient temperature, relative humidity, covering or clothing of the body, activity of scavengers, and wind currents. The cause, mode, and manner of death should also be considered.

The deceased should be examined at the site of death before the body has been moved. The more changes that are assessed, the more accurately can the time of death be estimated.

Changes in the eyes indicate that death has taken place and provide the following time clues: (1) Within a few minutes after death, segmentation and movement of blood columns in the retinal veins are apparent. (2) Clouding of the cornea, discoloration of the macula, and decreased intraocular pressure signify that death occurred several hours previously. (3) Sinking of the eyeballs into the sockets is noted several days after death.

Pallor of the skin, mucous membranes, and nail beds are the external evidence that circulation has ceased and is of no help in measuring the interval since death. Postmortem lividity is the result of settling of the blood into dependent parts of the body and may occur within twenty minutes to four hours, depending upon the manner of death and environmental conditions. Livor becomes most intense after eight to twelve hours, is fixed in dependent parts of the body in three to twelve hours and will not change position or disappear when the body is moved.

Postmortem rigidity is often considered the most valuable index of the time of death. Immediately after death, all the muscles are completely flaccid for a short time. Duration of flaccidity is influenced by such factors as physical activity before death, environmental conditions, and manner of death.

Rigidity may appear within minutes after death in persons who have been engaged in heavy or strenuous physical exertion or exercise.

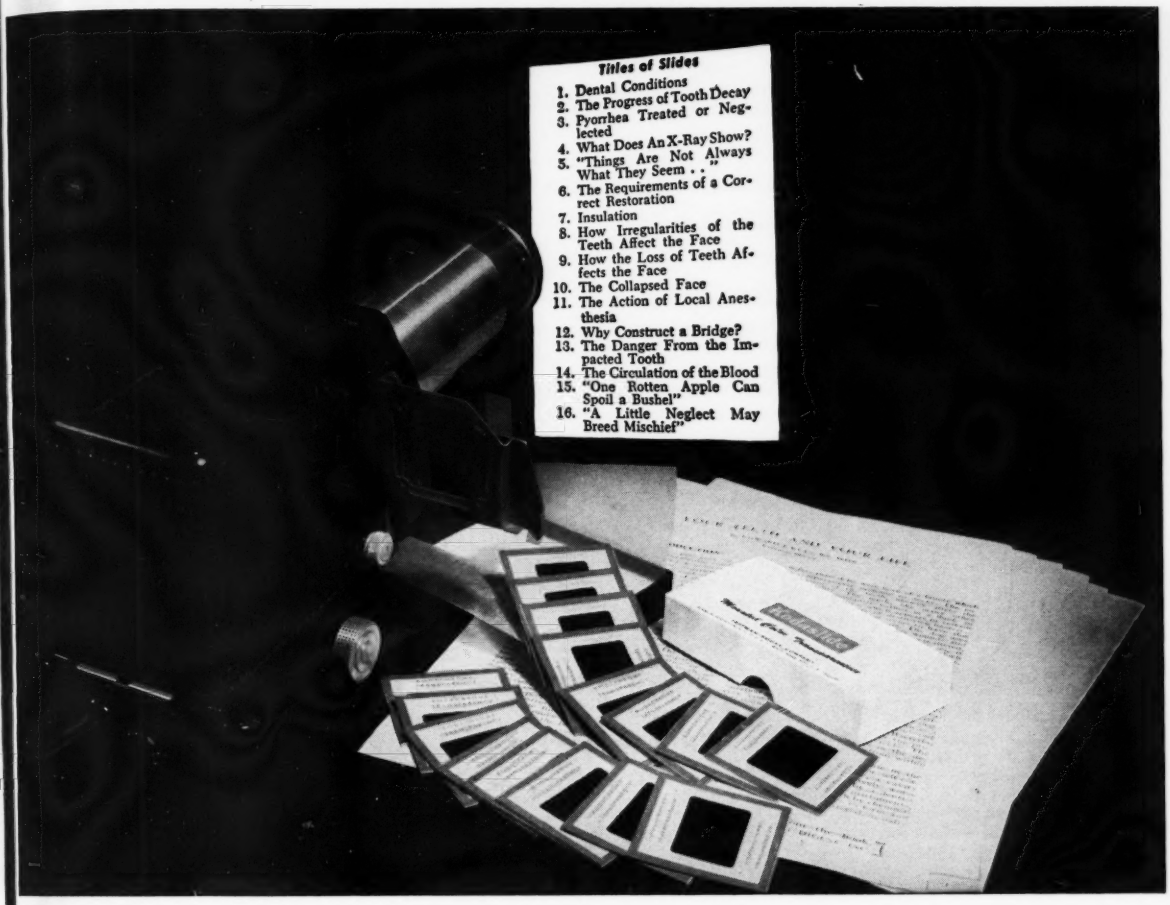
Putrefaction under ordinary environmental conditions generally occurs more than twenty-four hours after death. Onset is influenced by environmental temperature, humidity, air currents, postmortem movement of the body, and lividity. A high atmospheric temperature will cause putrefaction more rapidly than a cool temperature. Therefore, putrefaction is not a good means for determining the time of death.

Lyle, Herbert P.; Stemmer, Klause L.; and Cleveland, Frank P.: Determination of the Time of Death, J. Forensic Sc. **4**:167-175 (February) 1959.

Local Anesthetics—Reactions

It is recognized that local anesthetics may produce abnormal systemic reactions in some patients. It is doubtful, however, that any anesthetics com-

(*Continued on page* 390)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6. The Requirements of a Correct Restoration
7. Insulation
8. How Irregularities of the Teeth Affect the Face
9. How the Loss of Teeth Affects the Face
10. The Collapsed Face
11. The Action of Local Anesthesia
12. Why Construct a Bridge?
13. The Danger From the Impacted Tooth
14. The Circulation of the Blood
15. "One Rotten Apple Can Spoil a Bushel"
16. "A Little Neglect May Breed Mischief"

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(*Continued from page* 388)

monly used could cause true tissue sensitivity that would be prevented by graduated doses of these agents. Usually the allergenic manifestations of this nature depend on the presence of a protein which is involved in the antigen-antibody reaction.

When sensitive persons receive local anesthetics prior to dental care, the reactions consist of palpitation, dizziness, and fainting. These can be caused by epinephrine or other vasoconstrictors in the solution or by emotional instability of the patients. In general, any local tissue swelling which may occur may be attributed to histamine release. This can be prevented by administration of an antihistaminic drug. A localized tissue swelling also can be the result of increased reaction by the patient's tissue to trauma.

In the future management of a patient who has had one episode of local tissue swelling and may need further dentistry one should determine the history of the agents used prior to the reactions and knowledge of whether or not vasopressor drugs had been included in the solutions. Anesthetic agents of distinctly different structure and composition are available. It is possible, therefore, to use one not related to the one previously administered. The value of skin testing is questionable. It should be performed, however, with the agent to be used. The use of vasopressor drugs should be avoided and it might be wise to give the patient an antihistamine prior to injection of the anesthetic. If skin tests indicate a reaction, the local nerve block technique should be avoided and a general anesthetic, such as nitrous oxide, given.

Questions and Answers: Untoward Reactions to Local Anesthetics, JAMA **172**:225 (February 13) 1960.

Canker Sores: Treatment

LOUIS TUFT, M.D., LEONARD S. GIRSH, M.D., and L. N. ETTELSON, M.D., Philadelphia

In patients with canker sores, the elimination of foods containing citric acid (chocolates, citrus fruits) from the diets of those with positive mucosal tests to citric acid, and of foods containing acetic acid (vinegar, pickled foods, salads) from the diets of those with positive tests to acetic acid, was followed by complete relief or reduction in the number, frequency, and severity of the canker sores. On the other hand, ingestion of foods containing these acids caused recurrence of the canker sores. On the basis of these studies, therefore, definite casual relationship is indicated probably on an allergic basis, between these organic acids and canker sores. The elimination is suggested of foods containing citric and acetic acids in all patients with canker sores, even if mucosal tests with these acids are not done or are negative.

From Letters to the Journal, *Journal of the American Medical Association* **175**:188 (March 11) 1961.

Contra-Angles

Business Habits

MOST OF US spend our lives in quiet anonymity, performing routine chores to make a living. Our time is spent in unexciting repetitions, frequently in boredom, often in frustration. Even the people who are in the most exalted positions are required to give a large part of their time to tasks of tedium. They are not free from the physiologic demands of the body nor from the routine requirements of their position. Only in the make believe world of stage, screen, and television are people freed from the servitudes of the actual world. The exciting land of make-believe does not exist. In reality people have aches and pains, disappointments, unremitting labor and, if they are in good fortune, some moments of pleasure and joy and occasional feelings of accomplishment.

It is refreshing to remember that if we discharge these ordinary demands that are made upon us we have the chance to do some good in the world.

More than 80 years ago an unknown Englishman wrote an article in "The Leisure Hour." His words were reprinted recently in the *Harvard Business Review:*

"Most of the work to be done in this world is of an everyday and commonplace kind. Accordingly, the men and women in it are mostly of ordinary and moderate abilities. There are some heroes and men of genius, but these are few and far between. There would, no doubt, be more of them if they were wanted. The world is wretched, not for want of talents, but for want of goodness; and therefore we should long for the better doing of everyday and commonplace duties. To be able to raise

(*Continued on page* 392)

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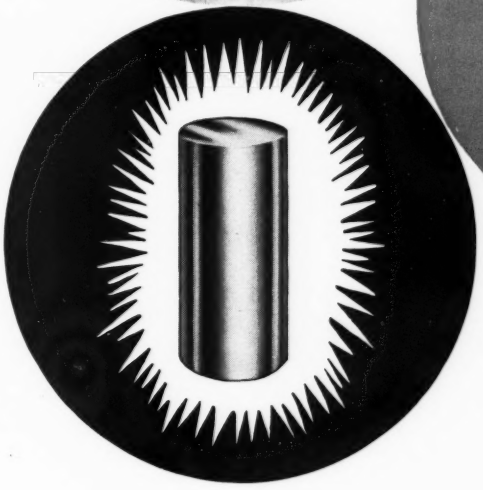

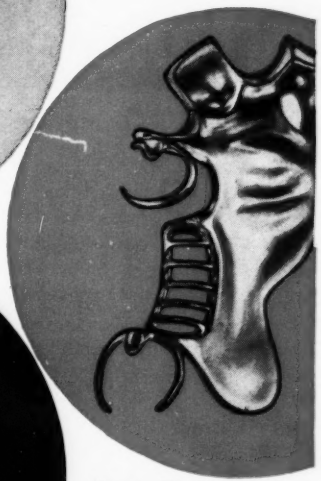

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To Walk or Ride

If you are a golfer you may be interested in this report from the *American Medical Association News:*

Twelve golfers were divided into two groups. Pairings were made as nearly as possible as to weight, age, and physical conditions. Before the golfers teed off a physician (Stanford A. Menachof) checked each player's temperature, blood pressure, weight, and pulse.

"Six golfers rode, six walked. Four and a half hours later and 18 holes later with temperature in the upper 70's and humidity high, the golfers were re-examined. Here is what Dr. Menachof found:

"Golfers who walked lost an average of four to five pounds, their blood pressure rose from eight to as much as 20 points. Blood pressure of the riders remained the same or dropped slightly. They suffered no appreciable weight loss.

"Pulse of riders decreased or remained the same while pulse of walkers jumped an average of 16 a minute. " 'The findings were interesting,' said Dr. Menachof, 'but from my observation of 12 golfers I couldn't say whether it is more beneficial to ride or walk.' "

The findings seem to prove nothing important, except: if you play golf for exercise, walk; if you play for recreation, ride.

Butter and Bread Diplomacy

The nutritionists and the agriculture technicians who can teach the under-privileged people of the world how to improve their food supply will do more to deter Communism than all the military power that can be assembled. The Youth Corps, if composed of young people who have nothing but talk to offer, will do little to improve the peace of the world. We do not need young people to preach democracy; we do need young people who are trained in animal husbandry and in the techniques of agriculture to show the underfed of the world how they may help themselves.

After the Fifth International Congress on Nutrition (attended by representatives from 60 countries and held in Washington) one report stated the issue clearly:

"Better solutions must be found to rectify the great world paradox of malnutrition resulting from overeating of an abundant food supply on one hand, and marginal or sub-marginal nutrition due to a limited, monotonous, protein-poor food supply on the other hand. Here nutrition is a global problem involving millions of people.

(*Continued on page* 395)

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In fact, the life and stability of our free and democratic society we know and love may depend on how well we are able to bring the technically underdeveloped countries to a higher plane of nutritional adequacy. A starving or underfed family is much more interested in food than political ideology. It will turn in the direction which presents a solution to the food problem. The challenge of the poorly fed millions may well be a greater challenge than outer space. If the food problem is not solved, outer space may be all we have left."

Human Affairs and the Sphincter Ani

The practitioners who attend the structures at the top of the alimentary canal and those who minister to the problems at the nether end should have a common bond. In the eyes of the public neither end is a zone of sweet acclaim. When people are troubled at either end of this canal they are glad to have the dentist or proctologist in attendance. These two specialists cannot meet a problem at the same time. One form of therapy requires an upright, heads-up position; the other a downside-up position.

Professors of English are not likely to turn to the *Journal of Proctology* (or DENTAL DIGEST) for examples of expressive prose. That is the professors' loss.

From the *Journal of Proctology* comes this sample of specific, colorful, exact, and skillful exposition. It is worthy to be included in any editorial stylebook or writer's manual:

"The prime objective of a hemorrhoidectomy is to remove the offending varicosity with as little damage as possible to the patient. You can damage, deform, ruin, remove, abuse, amputate, main, or mutilate every structure in and around the anus except one. That structure is the *sphincter ani*. There is not a muscle or structure in the body that has a more keenly developed sense of alertness and ability to accomodate itself to varying situations.

"They say that man has succeeded where the animals fail because of the clever use of his hands, yet when compared to the hands, the sphincter ani is far superior. If you place into your cupped hands a mixture of fluid, solid, and gas and then through an opening at the bottom try to let only the gas escape, you will fail. Yet the sphincter ani can do it! The sphincter apparently can differentiate between solid, fluid, and gas. It apparently can tell whether its owner is alone or with someone; whether standing up or sitting down; whether its owner has his pants off or on. No other muscle in the body is such a protector of the dignity of man, yet so ready to come to his relief. A muscle like this is worth protecting!"

The purpose of writing is to record an event or experience, convey an idea, or express an emotion. This delightful essay on the sphincter ani satisfies those requirements of effective writing.

—E. J. R.

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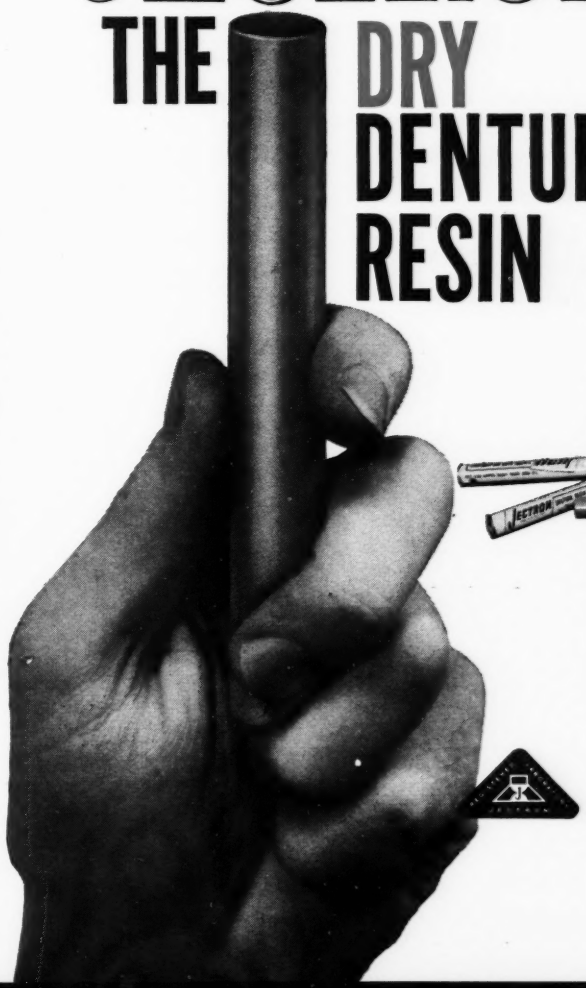

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ORAL DIAGNOSTIC SIGNS has been prepared by Edward J. Ryan, D.D.S., Editor of Dental Digest, and E. Cheraskin, M.D., D.M.D., Professor of Oral Medicine, University of Alabama.

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